Module Description/Course Syllabi

Study Programme: Bachelor of Mathematics
Faculty of Mathematics and Natural Sciences
Universitas Andalas

1. *Course number and name*

MAT62244 Boundary Value Problem

2. *Credits and contact hours/Number of ECTS credits allocated*

3 sks / 4,53 ECTS

3. *Instructors and course coordinator*

1. Dr. Arrival Rince Putri; 2. Dr. Noverina Alfiany

4. *Text book, title, author, and year*

1. Power David L, 2006, *Boundary Values Problem and Partial Differential equations*, Elsevier
2. Dawkins Paul, I, Nash, 2009, *Differential equations*

5. *Recommended reading and other learning resources/tools*

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6. *Specific course information*

A. Brief description of the content of the course (catalog description)

This course explains the Definition of Boundary Value Problems, Modeling related to boundary value problems, namely Hanging Cable, Heat Conduction in a Rod, Buckling of a Column, Radial Heat Flow, and Cooling Fin. The course also covers single boundary value problems at singular points and boundary value problems with domains of equations containing semi-infinite intervals. Fourier series of periodic functions, Derivation of Heat Conduction Equations, Steady State Temperature, MNASB, Wave Equation, and Potential Equation (Laplace) are also

part of this course. This course utilizes the Case-Based Method (CBM) of learning. Students understand and solve given cases related to the material they have studied
B. Prerequisites or co-requisites
Introduction to Partial Diffrential Equations MAT62243
C. Indicate whether a required or elective course in the program
Elective
D. Level of course unit (according to EQF: first cycle Bachelor, second cycle Master)
First Cycle Bachelor
E. Year of study when the course unit is delivered (if applicable)
3rd Year
F. Semester when the course unit is delivered
Even Semester
G. Mode of delivery (face-to-face, distance learning)
Face to face
7. *Intended Learning Outcomes*
ILO-4: An ability to use concepts and fundamental techniques of mathematics in solving simple mathematical problems.
ILO 6: Have ability in data literacy and technology and can apply them in solving simple mathematical problems or other relevant fields.
ILO 7: An ability to communicate effectively especially in the area of mathematics with diverse communities.

ILO 8: An ability to work in a team
8. *Course Learning Outcomes*
1. Students are able to solve initial value problems of linear equations.
2. Students are able to determine the Fourier series of a given function.
3. Students are able to solve heat conduction, wave propagation, and Dirichlet boundary value problems.
4. Students are capable of critical, analytical, and innovative thinking, able to present logical and structured arguments, and can discuss their findings effectively.
9. *Brief list of topics to be covered*
1. Definition of boundary value problems 2. Boundary value problems at singular points and domains of equations containing semi-infinite intervals 3. Cases related to partial differential equations
10. Learning and teaching methods
Small group discussion, CBM, Directed Learning
11. Language of instruction
Bahasa and English
12. Assessment methods and criteria
Summative Assessment : 1. Mid Test : 20% 3. Final Test : 20% 4. Group Report (based on case study) : 60% **Formative Assessment** : -